

NOTICES

JPO and NCIP are not responsible for any damages caused by the use of this translation.

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.*** shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]

[Claim 1] The CATV pin center,large which carries out intensity modulation of the laser beam, and sends it out at least with the n channel multiple signal which carried out the multiple-value digital modulation of the n compression digital video signals, respectively, and carried out frequency multiplex, While establishing k means which carry out frequency conversion of the channel (channel block) which predetermined m ($m < n$) individual adjoined collectively The hub in which two or more means to send out the channel block containing one channel wished from member's house to member's house were formed, A means to send out the information which specifies said channel block to which the channel of choice belongs to said hub, The CATV transmission system characterized by having member's house in which a means to compute and tune in the channel number of a m piece channel to the received channel of choice of said channel block was formed.

[Claim 2] The CATV transmission system according to claim 1 characterized by making the content of a program of m channels in a channel block which adjoined into the same genre.

[Claim 3] The CATV transmission system according to claim 1 or 2 characterized by using a QAM method for the multiple-value digital modulation of a compression digital video signal, and setting the occupancy band per channel to less than 6MHz.

[Claim 4] Claims 1 and 2 characterized by carrying out direct intensity modulation of the semiconductor laser, and sending it out with an n channel multiple signal, or a CATV transmission system given in three.

[Claim 5] Claims 1 and 2 characterized by carrying out intensity modulation of the laser beam, and sending it out with an n channel multiple signal using an external optical modulator, or a CATV transmission system given in three.

[Translation done.]

* NOTICES *

JPO and NCIP are not responsible for any damages caused by the use of this translation.

1.This document has been translated by computer. So the translation may not reflect the original precisely.

2.**** shows the word which can not be translated.

3.In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the CATV transmission system which can carry out the service of the compression digital video signal of hundreds of or more channels.

[0002]

[Description of the Prior Art] In the urban CATV of current our country, the image service of 30 or more channels is performed, and transmission equipment which can transmit 80 channels with one optical fiber is also put in practical use. Many channels and a high-definition image trend towards service economy are called for increasingly, and by current, the next-generation CATV system which can do the multi-tea NERUSA-screw of about 500 channels with a compression digital video signal is being various-kinds-proposed, and is being put in practical use from now on also.

[0003] The method which carried out the multiple-value digital modulation of the compression digital video signal first in the CATV pin center,large in these systems and which carries out [a method] after frequency multiplex and is transmitted with an optical fiber is common. If a 16QAM method is used as a multiple-value digital modulation method, transmission of 20 Mb/s extent is possible in a 6MHz [per channel] band, frequency multiplex [of these QAM signal] is carried out, and if direct intensity modulation of the semiconductor laser is carried out, transmission of about 1000 channels will be attained. The comprehensive band at this time also amounts to 6GHz.

[0004] In order to transmit such a signal of a super-broadband, the method which transmits using optical FIBA - from a CATV pin center,large to member's house, or prepares a hub between a pin center,large and member's house, tunes in in a hub according to the information on the channel of choice from a subscriber, and transmits only the channel can be considered. In the case of the former, immense capitalization is required from the need of the tuner of a super-broadband being needed for each member's house, and still more newly laying an optical fiber to member's house. In the case of the latter, since the band of the transmission line from a hub to member's house may be narrow, it has the advantage that a coaxial cable can be used.

[0005]

[Problem(s) to be Solved by the Invention] However, the thing of a super-broadband is needed and, moreover, the tuner for tuning in in a hub must be equipped only with the number of subscribers. Therefore, the big hub installation tooth space was needed, and there was a fault that immense expense started reservation of a ground etc.

[0006] By sharing a channel selection means with a hub and a member's house tuner, and establishing it in view of the technical problem of this conventional transmission system, this invention attains miniaturization of a hub, and cheap-ization of a subscriber terminal, and aims at offering the transmission system excellent in the profitability which makes possible the image service of the many channels which are not in the former. [0007]

[Means for Solving the Problem] This invention establishes the means which carries out a m piece channel package out of the many channel signaling by which frequency multiplex was carried out and which carries out frequency conversion in a hub in order to solve the above-mentioned technical problem, a means to send out to a hub the information which specifies the channel block to which the channel of choice belongs in member's house, and a means to compute the channel number of a m piece channel to the received

channel of choice.

[0008]

[Function] In this invention, in a hub, package frequency conversion of the block of relevance is carried out using the block information from a subscriber, and it transmits to member's house. In member's house, the channel number of a m piece channel to the received channel of choice can be computed, and it can tune in, view and listen with the tuner formed in member's house.

[0009] Thus, in a hub, by carrying out package frequency conversion per channel block, if there are n/m frequency-conversion means, it can respond to a channel selection demand of all subscribers.

[0010]

[Example] Hereafter, the example of this invention is explained with reference to a drawing.

[0011] Drawing 1 is the block diagram showing the configuration of one example of this invention. In drawing 1, in 1, the frequency multiplex section (FDM) and 3 are the optical transmitting sections (E/O), and n 16QAM modulator groups and 2 constitute the CATV pin center, large. Moreover, 4 is an optical fiber and has connected the subscription employee's house with the CATV pin center, large. Furthermore, the frequency conversion section which an optical receive section (O/E) and 6 become from block converter 1-k ($k=n/m$) in 5, the transmitting section which the allotting switch section and 8 become from transmitter 1-i in 7, and 9 are channel-select-signal receive sections, and constitute the hub. Moreover, as for a receive section and 11, a channel selection keyboard and 14 are the channel-select-signal sending-out sections, and the channel selection section and 12 constitute [10 / a 16QAM demodulator and 13] the subscription employee's house.

[0012] The transmission system of this example carries out 16QAM of the compression digital video signal from a CATV pin center, large, it carries out 960-channel frequency multiplex, is transmitted to two or more hubs with an optical fiber, from a hub, uses a coaxial cable etc. for applicable member's house, and transmits about 80 containing one channel which the subscriber chose to it. In such a configuration, the detailed actuation is explained below.

[0013] In the CATV pin center, large, quadrature modulation of the n compression digital video signals is carried out by the 16QAM modulator group 1, respectively, and it outputs to the frequency multiplex section 2. In the frequency multiplex section 2, frequency multiplex [of the 960 signals by which quadrature modulation was carried out] is carried out in a 6MHz [per channel] band, and they are sent out to the optical transmitting section 3, are changed into a lightwave signal and sent out to each hub through an optical fiber 4.

[0014] In a hub, after changing into an electrical signal in the optical receive section 5, it distributes to the 12 block converters 1-12.

[0015] 80 channels will be contained in each channel block when 960 channels transmitted are divided into 12 channel blocks. Each block converters 1-12 carry out frequency conversion of the predetermined channel block to the band of the tuner 11 currently installed in member's house. And the signal by which frequency conversion was carried out is sent to the allotting switch section 7. With the control signal from the channel-select-signal receive section 9, the allotting switch section 7 connects the output from the block converters 1-12 to the transmitter 1 - i which transmit to applicable member's house of the transmitting section 8.

[0016] In the receive section 10 established in member's house, the channel of choice tunes in in the channel selection section 11 with the selection signal from the channel selection keyboard 13, it gets over in the 16QAM demodulator 12, and the received m channel multiple signal is decoded in the compression digital decryption section, and is sent out to Monitor TV. In a channel selection, a subscriber inputs the channel number of hope with the channel selection keyboard 13 first. Within the channel selection keyboard 13, from a channel number, the number of the channel block to which the channel belongs is collated, and the applicable number information on a channel block is sent out to the channel-select-signal sending-out section 14. It computes equivalent to what position in a channel block the channel of choice is simultaneously, and the channel selection signal is sent out to the channel selection section 11. Said channel block number information is sent out to the channel-select-signal receive section 9 of a hub from the channel-select-signal sending-out section 14. The telephone line etc. is used for this transmission.

[0017] It is realizable to compute the location of the channel of choice within said channel block with an easy algorithm. For example, if the 165th channel is tuned in and division of 165 is carried out by 80, it turns out that an applicable channel is located in the 5th of the 3rd channel block.

[0018] Thus, in this example, by the approach of dividing into a channel block and carrying out package frequency multiplex in a hub, it miniaturizes and-izing of the facility in a hub can be carried out [cheap]. If the content of the program which belongs in the still more nearly same channel block is made into the same genre and the channel selection in an applicable channel block will be performed in member's house, it becomes possible to decrease the count of a communication link to a hub, structure of the channel selection keyboard 13 can also be made still simpler, and cheap-ization can be attained. Moreover, since a subscriber has received only the favorite genre even if he does not tune in from hundreds of channels, convenience -- a channel selection becomes easy -- becomes high.

[0019] It can realize much more economically from the ability of the device used in a present broadcast wave and CATV, or components to be used by setting the occupancy band per channel to less than 6MHz, using a 16QAM method as a multiple-value digital modulation method of a compression digital video signal.

[0020] In addition, although this example explained the example which carries out direct intensity modulation of the semiconductor laser, and sends it out with a multiple signal, it cannot be overemphasized that the operation effectiveness with the same said of carrying out intensity modulation of the laser beam, and sending it out with a multiple signal using an external optical modulator is acquired. If an external optical modulator is used, even if it combines 1.5um band optical fiber amplifier and the 1.3um zero distribution single mode fiber laid from the former, it will be hard to receive lightwave signal degradation by wavelength dispersion. For this reason, there is an advantage of being able to design flexibly the transmission network which can many branch the lightwave signal from a CATV pin center, large -- that a transmission distance can be developed and optical junction can be performed -- by introducing an optical fiber amplifier.

[0021] Moreover, in this example, although transmission of only a compression digital video signal was explained, it is also possible to transmit analog video signals, such as a broadcast wave, simultaneously. For example, FM analog video signal of AM of terrestrial broadcasting or a satellite broadcast wave is assigned to a specific channel block, it considers as the basic service channel to an ordinary subscriber, the channel selection keyboard 13 is formed in member's house which wishes for a digital video signal, a tariff is collected, and it can make it possible to receive the digital video signal of hope.

[0022] [Effect of the Invention] Since the number of converters can be substantially reduced since what is necessary is just to carry out a block convert, and multi-use parts can moreover be used for a numerous subscriber terminal, according to this invention, miniaturization of a hub and cheap-ization of a terminal can be attained in a hub, so that clearly from the place described above.

[0023] Moreover, between a hub and member's house, since the existing transmission line is utilizable, plant-and-equipment investment of the whole system can be reduced, and it has the practical effectiveness excellent in profitability -- the image service of the many channels which moreover are not in the former can be offered.

[Translation done.]

*.NOTICES *

JPO and NCIP are not responsible for any damages caused by the use of this translation.

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.*** shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

TECHNICAL FIELD

[Industrial Application] This invention relates to the CATV transmission system which can carry out the service of the compression digital video signal of hundreds of or more channels.

[Translation done.]

NOTICES

JPO and NCIP are not responsible for any damages caused by the use of this translation.

1.This document has been translated by computer. So the translation may not reflect the original precisely.

2.*** shows the word which can not be translated.

3.In the drawings, any words are not translated.

PRIOR ART

[Description of the Prior Art] In the urban CATV of current our country, the image service of 30 or more channels is performed, and transmission equipment which can transmit 80 channels with one optical fiber is also put in practical use. Many channels and a high-definition image trend towards service economy are called for increasingly, and by current, the next-generation CATV system which can do the multi-tea NERUSA-screw of about 500 channels with a compression digital video signal is being various-kinds-proposed, and is being put in practical use from now on also.

[0003] The method which carried out the multiple-value digital modulation of the compression digital video signal first in the CATV pin center,large in these systems and which carries out [a method] after frequency multiplex and is transmitted with an optical fiber is common. If a 16QAM method is used as a multiple-value digital modulation method, transmission of 20 Mb/s extent is possible in a 6MHz [per channel] band, frequency multiplex [of these QAM signal] is carried out, and if direct intensity modulation of the semiconductor laser is carried out, transmission of about 1000 channels will be attained. The comprehensive band at this time also amounts to 6GHz.

[0004] In order to transmit such a signal of a super-broadband, the method which transmits using optical FIBA - from a CATV pin center,large to member's house, or prepares a hub between a pin center,large and member's house, tunes in in a hub according to the information on the channel of choice from a subscriber, and transmits only the channel can be considered. In the case of the former, immense capitalization is required from the need of the tuner of a super-broadband being needed for each member's house, and still more newly laying an optical fiber to member's house. In the case of the latter, since the band of the transmission line from a hub to member's house may be narrow, it has the advantage that a coaxial cable can be used.

[Translation done.]

* NOTICES *

JPO and NCIP are not responsible for any damages caused by the use of this translation.

1.This document has been translated by computer. So the translation may not reflect the original precisely.

2.*** shows the word which can not be translated.

3.In the drawings, any words are not translated.

EFFECT OF THE INVENTION

[Effect of the Invention] Since the number of converters can be substantially reduced since what is necessary is just to carry out a block convert, and multi-use parts can moreover be used for a numerous subscriber terminal, according to this invention, miniaturization of a hub and cheap-ization of a terminal can be attained in a hub, so that clearly from the place described above.

[0023] Moreover, between a hub and member's house, since the existing transmission line is utilizable, plant-and-equipment investment of the whole system can be reduced, and it has the practical effectiveness excellent in profitability -- the image service of the many channels which moreover are not in the former can be offered.

[Translation done.]

*.NOTICES *

JPO and NCIP are not responsible for any damages caused by the use of this translation.

1.This document has been translated by computer. So the translation may not reflect the original precisely.

2.**** shows the word which can not be translated.

3.In the drawings, any words are not translated.

TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] However, the thing of a super-broadband is needed and, moreover, the tuner for tuning in in a hub must be equipped only with the number of subscribers. Therefore, the big hub installation tooth space was needed, and there was a fault that immense expense started reservation of a ground etc.

[0006] By sharing a channel selection means with a hub and a member's house tuner, and establishing it in view of the technical problem of this conventional transmission system, this invention attains miniaturization of a hub, and cheap-ization of a subscriber terminal, and aims at offering the transmission system excellent in the profitability which makes possible the image service of the many channels which are not in the former.

[Translation done.]

*.NOTICES *

JPO and NCIPJ are not responsible for any damages caused by the use of this translation.

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.*** shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

MEANS

[Means for Solving the Problem] This invention establishes the means which carries out a m piece channel package out of the many channel signaling by which frequency multiplex was carried out and which carries out frequency conversion in a hub in order to solve the above-mentioned technical problem, a means to send out to a hub the information which specifies the channel block to which the channel of choice belongs in member's house, and a means to compute the channel number of a m piece channel to the received channel of choice.

[Translation done.]

* NOTICES *

JPO and NCIPi are not responsible for any damages caused by the use of this translation.

1.This document has been translated by computer. So the translation may not reflect the original precisely.

2.**** shows the word which can not be translated.

3.In the drawings, any words are not translated.

OPERATION

[Function] In this invention, in a hub, package frequency conversion of the block of relevance is carried out using the block information from a subscriber, and it transmits to member's house. In member's house, the channel number of a m piece channel to the received channel of choice can be computed, and it can tune in, view and listen with the tuner formed in member's house.

[0009] Thus, in a hub, by carrying out package frequency conversion per channel block, if there are n/m frequency-conversion means, it can respond to a channel selection demand of all subscribers.

[Translation done.]

NOTICES

JPO and NCIP are not responsible for any damages caused by the use of this translation.

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.**** shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

EXAMPLE

[Example] Hereafter, the example of this invention is explained with reference to a drawing.

[0011] Drawing 1 is the block diagram showing the configuration of one example of this invention. In drawing 1, in 1, the frequency multiplex section (FDM) and 3 are the optical transmitting sections (E/O), and n 16QAM modulator groups and 2 constitute the CATV pin center,large. Moreover, 4 is an optical fiber and has connected the subscription employee's house with the CATV pin center,large. Furthermore, the frequency conversion section which an optical receive section (O/E) and 6 become from block converter 1-k ($k=n/m$) in 5, the transmitting section which the allotting switch section and 8 become from transmitter 1-i in 7, and 9 are channel-select-signal receive sections, and constitute the hub. Moreover, as for a receive section and 11, a channel selection keyboard and 14 are the channel-select-signal sending-out sections, and the channel selection section and 12 constitute [10 / a 16QAM demodulator and 13] the subscription employee's house.

[0012] The transmission system of this example carries out 16QAM of the compression digital video signal from a CATV pin center,large, it carries out 960-channel frequency multiplex, is transmitted to two or more hubs with an optical fiber, from a hub, uses a coaxial cable etc. for applicable member's house, and transmits about 80 containing one channel which the subscriber chose to it. In such a configuration, the detailed actuation is explained below.

[0013] In the CATV pin center,large, quadrature modulation of the n compression digital video signals is carried out by the 16QAM modulator group 1, respectively, and it outputs to the frequency multiplex section 2. In the frequency multiplex section 2, frequency multiplex [of the 960 signals by which quadrature modulation was carried out] is carried out in a 6MHz [per channel] band, and they are sent out to the optical transmitting section 3, are changed into a lightwave signal and sent out to each hub through an optical fiber 4.

[0014] In a hub, after changing into an electrical signal in the optical receive section 5, it distributes to the 12 block converters 1-12.

[0015] 80 channels will be contained in each channel block when 960 channels transmitted are divided into 12 channel blocks. Each block converters 1-12 carry out frequency conversion of the predetermined channel block to the band of the tuner 11 currently installed in member's house. And the signal by which frequency conversion was carried out is sent to the allotting switch section 7. With the control signal from the channel-select-signal receive section 9, the allotting switch section 7 connects the output from the block converters 1-12 to the transmitter 1 - i which transmit to applicable member's house of the transmitting section 8.

[0016] In the receive section 10 established in member's house, the channel of choice tunes in in the channel selection section 11 with the selection signal from the channel selection keyboard 13, it gets over in the 16QAM demodulator 12, and the received m channel multiple signal is decoded in the compression digital decryption section, and is sent out to Monitor TV. In a channel selection, a subscriber inputs the channel number of hope with the channel selection keyboard 13 first. Within the channel selection keyboard 13, from a channel number, the number of the channel block to which the channel belongs is collated, and the applicable number information on a channel block is sent out to the channel-select-signal sending-out section 14. It computes equivalent to what position in a channel block the channel of choice is simultaneously, and the channel selection signal is sent out to the channel selection section 11. Said channel block number information is sent out to the channel-select-signal receive section 9 of a hub from

the channel-select-signal sending-out section 14. The telephone line etc. is used for this transmission.

[0017] It is realizable to compute the location of the channel of choice within said channel block with an easy algorithm. For example, if the 165th channel is tuned in and division of 165 is carried out by 80, it turns out that an applicable channel is located in the 5th of the 3rd channel block.

[0018] Thus, in this example, by the approach of dividing into a channel block and carrying out package frequency multiplex in a hub, it miniaturizes and-izing of the facility in a hub can be carried out [cheap]. If the content of the program which belongs in the still more nearly same channel block is made into the same genre and the channel selection in an applicable channel block will be performed in member's house, it becomes possible to decrease the count of a communication link to a hub, structure of the channel selection keyboard 13 can also be made still simpler, and cheap-ization can be attained. Moreover, since a subscriber has received only the favorite genre even if he does not tune in from hundreds of channels, convenience -- a channel selection becomes easy -- becomes high.

[0019] It can realize much more economically from the ability of the device used in a present broadcast wave and CATV, or components to be used by setting the occupancy band per channel to less than 6MHz, using a 16QAM method as a multiple-value digital modulation method of a compression digital video signal.

[0020] In addition, although this example explained the example which carries out direct intensity modulation of the semiconductor laser, and sends it out with a multiple signal, it cannot be overemphasized that the operation effectiveness with the same said of carrying out intensity modulation of the laser beam, and sending it out with a multiple signal using an external optical modulator is acquired. If an external optical modulator is used, even if it combines 1.5um band optical fiber amplifier and the 1.3um zero distribution single mode fiber laid from the former, it will be hard to receive lightwave signal degradation by wavelength dispersion. For this reason, there is an advantage of being able to design flexibly the transmission network which can many branch the lightwave signal from a CATV pin center,large -- that a transmission distance can be developed and optical junction can be performed -- by introducing an optical fiber amplifier.

[0021] Moreover, in this example, although transmission of only a compression digital video signal was explained, it is also possible to transmit analog video signals, such as a broadcast wave, simultaneously. For example, FM analog video signal of AM of terrestrial broadcasting or a satellite broadcast wave is assigned to a specific channel block, it considers as the basic service channel to an ordinary subscriber, the channel selection keyboard 13 is formed in member's house which wishes for a digital video signal, a tariff is collected, and it can make it possible to receive the digital video signal of hope.

[Translation done.]

*NOTICES *

JPO and NCIP are not responsible for any damages caused by the use of this translation.

1.This document has been translated by computer. So the translation may not reflect the original precisely.

2.**** shows the word which can not be translated.

3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the block diagram showing the configuration of the CATV transmission system of the 1st example of this invention.

[Description of Notations]

- 1 16QAM Modulator Group
- 2 Frequency Multiplex Section (FDM)
- 3 Optical Transmitting Section (E/O)
- 4 Optical Fiber
- 5 Optical Receive Section (O/E)
- 6 Frequency-Conversion Section
- 7 Allotting Switch Section
- 8 Transmitting Section
- 9 Channel-Select-Signal Receive Section
- 10 Receive Section
- 11 Channel Selection Section
- 12 16QAM Demodulator
- 13 Channel Selection Keyboard
- 14 Channel-Select-Signal Sending-Out Section

[Translation done.]

• *NOTICES *

JPO and NCIP are not responsible for any
damages caused by the use of this translation.

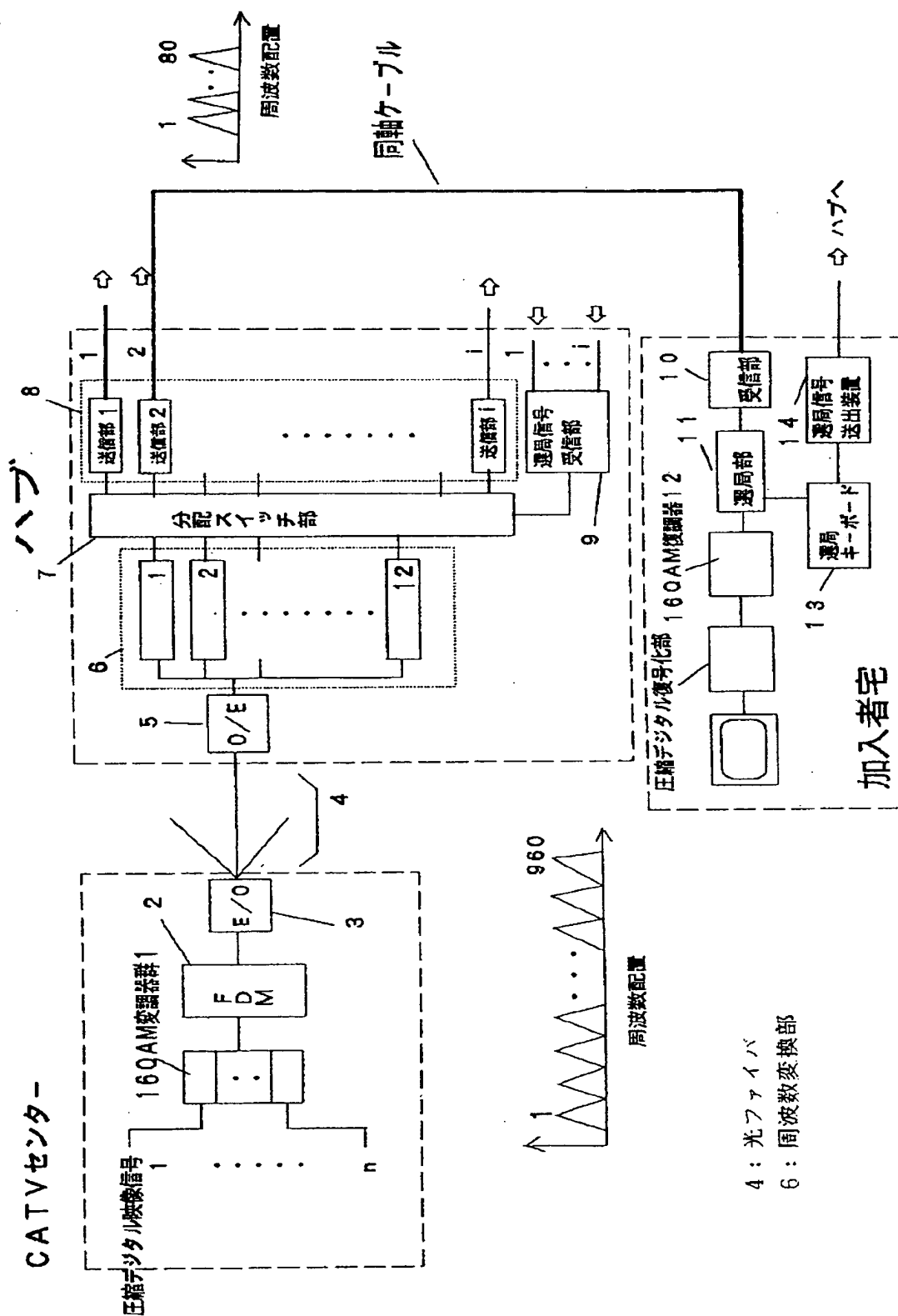
1.This document has been translated by computer. So the translation may not reflect the original precisely.

2.**** shows the word which can not be translated.

3.In the drawings, any words are not translated.

DRAWINGS

[Drawing 1]



[Translation done.]

(19) 日本国特許庁 (J P)

(12) 公開特許公報 (A)

(11) 特許出願公開番号

特開平7-170244

(43) 公開日 平成7年(1995)7月4日

(51) Int.Cl.⁹

識別記号

庁内整理番号

F I

技術表示箇所

H 0 4 J 14/00

14/02

H 0 4 B 10/00

9372-5K

H 0 4 B 9/ 00

E

9372-5K

C

審査請求 未請求 請求項の数 5 O L (全 6 頁) 最終頁に続く

(21) 出願番号

特願平5-315133

(22) 出願日

平成5年(1993)12月15日

(71) 出願人 000005821

松下電器産業株式会社

大阪府門真市大字門真1006番地

(72) 発明者 中田 裕章

大阪府門真市大字門真1006番地 松下電器
産業株式会社内

(72) 発明者 布施 優

大阪府門真市大字門真1006番地 松下電器
産業株式会社内

(72) 発明者 前田 和貴

大阪府門真市大字門真1006番地 松下電器
産業株式会社内

(74) 代理人 弁理士 松田 正道

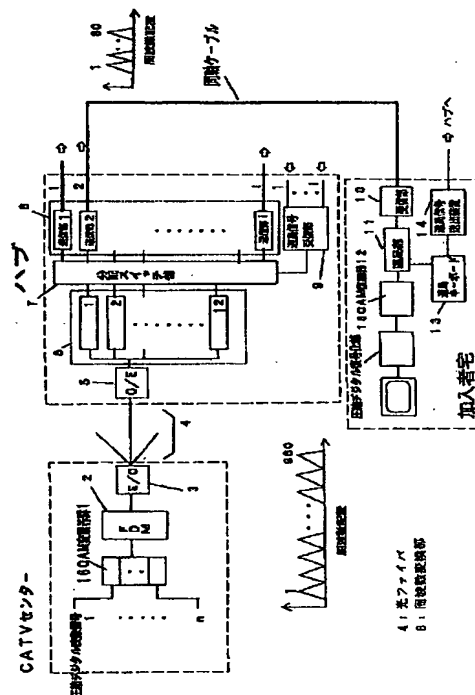
最終頁に続く

(54) 【発明の名称】 CATV伝送システム

(57) 【要約】

【目的】 経済性に優れた多チャンネル映像信号サービスが可能なCATV伝送システムの提供を目的とする。

【構成】 CATVセンターから数百チャンネルの多重信号を光伝送しハブに設けたブロックコンバータ群6により所定のチャンネルブロックをそれぞれ一括周波数変換し、加入者の要求に応じ周波数変換した該当チャンネルブロックのみを送信し、加入者宅に設けた選局キーボード13において希望チャンネル位置を算出し、選局部11において希望チャンネルを視聴することを特徴とするCATV伝送システム。



【特許請求の範囲】

【請求項1】少なくとも、 n 個の圧縮デジタル映像信号をそれぞれ多値デジタル変調し周波数多重した n チャンネル多重信号でレーザ光を輝度変調し送出するCATVセンターと、

所定の m ($m < n$) 個の隣接したチャンネル（チャンネルブロック）を一括して周波数変換する手段を k 個設けるとともに、加入者宅からの希望した1チャンネルを含むチャンネルブロックを加入者宅に送出する手段を複数設けたハブと、

希望チャンネルの属する前記チャンネルブロックを指定する情報を前記ハブに送出する手段と、受信した前記チャンネルブロックの m 個チャンネルから希望チャンネルのチャンネル番号を算出し選局する手段とを設けた加入者宅とを、備えたことを特徴とするCATV伝送システム。

【請求項2】チャンネルブロック内の m 個の隣接したチャンネルの番組内容を、同一ジャンルにすることを特徴とする請求項1記載のCATV伝送システム。

【請求項3】圧縮デジタル映像信号の多値デジタル変調にQAM方式を用い、1チャンネル当たりの占有帯域を6MHz以内とすることを特徴とする請求項1または2記載のCATV伝送システム。

【請求項4】 n チャンネル多重信号で半導体レーザを直接輝度変調し送出することを特徴とする請求項1、2、または3記載のCATV伝送システム。

【請求項5】外部光変調器を用い n チャンネル多重信号でレーザ光を輝度変調し送出することを特徴とする請求項1、2、または3記載のCATV伝送システム。

【発明の詳細な説明】

【0001】

【産業上の利用分野】本発明は、数百チャンネル以上の圧縮デジタル映像信号をサービスできるCATV伝送システムに関するものである。

【0002】

【従来の技術】現在わが国の都市型CATVでは、30チャンネル以上の映像サービスがおこなわれており、80チャンネルを1本の光ファイバーで伝送できる伝送装置も実用化されている。今後もますます多チャンネル、高画質映像サービス化が求められており、現在では、圧縮デジタル映像信号により500チャンネル程度の多チャンネルサービスができる次世代CATVシステムが各種提案、実用化されつつある。

【0003】これらシステムでは、CATVセンターにおいて圧縮デジタル映像信号をまず多値デジタル変調したのち周波数多重し、光ファイバーにより伝送する方式が一般的である。多値デジタル変調方式として16QAM方式を用いれば1チャンネル当たり6MHzの帯域内で20Mb/s程度の伝送が可能であり、これらQAM信号を周波数多重し半導体レーザを直接輝度変調すれば1000チャンネル程度の伝送が可能となる。このときの総

合帯域は6GHzにもおよぶ。

【0004】このような超広帯域の信号を伝送するためには、CATVセンターから加入者宅まで光ファイバーを用い伝送するか、センターと加入者宅の間にハブを設け、加入者からの希望チャンネルの情報に応じハブで選局しそのチャンネルのみを伝送する方式が考えられる。前者の場合、各加入者宅に超広帯域のチューナが必要となり、さらに新たに加入者宅まで光ファイバーを敷設する必要から莫大な投資が必要である。後者の場合、ハブから加入者宅までの伝送路の帯域は狭くてよいので同軸ケーブルが使用できるという利点がある。

【0005】

【発明が解決しようとする課題】しかしながら、ハブで選局するためのチューナは超広帯域のものが必要となり、しかも加入者の数だけ備えなければならない。したがって大きなハブ設置スペースが必要となり、土地の確保などに莫大な経費がかかるという欠点があった。

【0006】本発明はかかる従来の伝送方式の課題に鑑み、選局手段をハブと加入者宅チューナに分担して設けることにより、ハブの小型化、加入者端末の低廉化を図り、従来にない多チャンネルの映像サービスを可能にする経済性に優れた伝送システムを提供することを目的としている。

【0007】

【課題を解決するための手段】本発明は上記課題を解決するために、周波数多重された多チャンネル信号のなかから m 個チャンネル一括してハブ内で周波数変換する手段と、加入者宅では希望チャンネルの属するチャンネルブロックを指定する情報をハブに送出する手段と、受信した m 個チャンネルから希望チャンネルのチャンネル番号を算出する手段とを設けたものである。

【0008】

【作用】本発明では、ハブでは加入者からのブロック情報により該当のブロックを一括周波数変換し、加入者宅に伝送する。加入者宅では受信した m 個チャンネルから希望チャンネルのチャンネル番号を算出し、加入者宅に設けられているチューナにより選局、視聴することができる。

【0009】このようにハブ内ではチャンネルブロック単位で一括周波数変換することにより、周波数変換手段が n/m 個あれば全ての加入者の選局要求に対応できる。

【0010】

【実施例】以下、本発明の実施例について図面を参照して説明する。

【0011】図1は本発明の一実施例の構成を示すブロック図である。図1において、1は n 個の16QAM変調器群、2は周波数多重部(FDM)、3は光送信部(E/O)であって、CATVセンターを構成している。また、4は光ファイバーであって、CATVセンターと加入者宅を接続している。さらに、5は光受信部(O/E)、6はブロックコンバータ1~ k ($k = n/$

m) からなる周波数変換部、7は分配スイッチ部、8は送信器1〜iからなる送信部、9は選局信号受信部であって、ハブを構成している。また、10は受信部、11は選局部、12は16QAM復調器、13は選局キーボード、14は選局信号送出部であって、加入者宅を構成している。

【0012】本実施例の伝送システムは、CATVセンターから圧縮デジタル映像信号を16QAMし960チャンネル周波数多重して光ファイバで複数のハブまで伝送し、ハブからは、加入者の選択した1チャンネルを含む80チャンネル程度を該当加入者宅に同軸ケーブルなどを用い伝送するものである。このような構成において以下その詳細な動作を説明する。

【0013】CATVセンターでは、n個の圧縮デジタル映像信号を16QAM変調器群1でそれぞれ直交変調し周波数多重部2へ出力する。960個の直交変調された信号は周波数多重部2において1チャンネル当たり6MHzの帯域で周波数多重され、光送信部3に送出され光信号に変換されて、光ファイバ4を通じて各ハブに送出される。

【0014】ハブでは、光受信部5で電気信号に変換したのち、12個のブロックコンバータ1〜12に分配する。

【0015】伝送されてくる960チャンネルを12個のチャンネルブロックに分割すると、各チャンネルブロックには80チャンネル含まれることになる。各ブロックコンバータ1〜12は、加入者宅に設置されているチューナ11の帯域に所定のチャンネルブロックを周波数変換する。そして周波数変換された信号は分配スイッチ部7に送られる。分配スイッチ部7は選局信号受信部9からの制御信号により、ブロックコンバータ1〜12からの出力を送信部8の該当加入者宅に送信する送信器1〜iに接続する。

【0016】加入者宅に設けられた受信部10で、受信されたmチャンネル多重信号は選局キーボード13からの選択信号により選局部11で希望チャンネルが選局され、16QAM復調器12において復調され圧縮デジタル復号化部において復号されてモニターTVに送出される。選局にあたっては、まず加入者が希望のチャンネル番号を選局キーボード13により入力する。選局キーボード13内では、チャンネル番号から、そのチャンネルが属するチャンネルブロックの番号を照合しチャンネルブロックの該当番号情報を選局信号送出部14に送出する。同時にチャンネルブロック内の何番目に希望チャンネルが当たるかを算出し選局部11にそのチャンネル選択信号を送出する。前記チャンネルブロック番号情報は、選局信号送出部14からハブの選局信号受信部9に送出される。この伝送には電話回線などを使用する。

【0017】前記チャンネルブロック内での希望チャンネルの位置を算出するのは簡単なアルゴリズムで実現でき

る。例えば第165チャンネルを選局するとすれば、165を80で割算すれば、3番目のチャンネルブロックの5番目に該当チャンネルが位置することがわかる。

【0018】このように本実施例では、チャンネルブロックに分割しハブで一括周波数多重する方法によりハブ内の設備を小型化、低廉化できる。さらに同じチャンネルブロック内に属する番組の内容を同一のジャンルにし、該当チャンネルブロック内の選局は加入者宅で行うことにすれば、ハブへの通信回数を減少させることが可能になり、選局キーボード13の構造も一層簡素にでき低廉化が図れる。また加入者は数百のチャンネルから選局しなくても好みのジャンルのみを受信しているので選局が容易になるなど利便性が高くなる。

【0019】圧縮デジタル映像信号の多値デジタル変調方式として16QAM方式を用い、1チャンネル当たりの占有帯域を6MHz以内とすることにより、現在の放送波やCATVにおいて用いられている機器や部品が使用できることから、一層経済的に実現できる。

【0020】なお、本実施例では多重信号で半導体レーザを直接輝度変調し送出する例を説明したが、外部光変調器を用い多重信号でレーザ光を輝度変調し送出することでも同様の作用効果が得られることはいうまでもない。外部光変調器を用いれば、1.5μm帯光ファイバアンプと従来から敷設されている1.3μmゼロ分散シングルモードファイバとを組合せても波長分散による光信号劣化を受けにくい。このため、光ファイバアンプを導入することにより、CATVセンターからの光信号を多分岐できる、伝送距離が伸ばせる、光中継ができるなど伝送網を柔軟に設計できるなどの利点がある。

【0021】また本実施例では、圧縮デジタル映像信号のみの伝送について説明したが、放送波などのアナログ映像信号を同時に伝送することも可能である。たとえば、特定のチャンネルブロックには地上放送波のAMや衛星放送波のFMアナログ映像信号を割り当て、一般加入者への基本サービスチャンネルとし、デジタル映像信号を希望する加入者宅には選局キーボード13を設け料金を徴収し希望のデジタル映像信号を受信できるようにすることもできる。

【0022】

【発明の効果】以上述べたところから明らかなように、本発明によれば、ハブではブロックコンバートするだけでよいから、コンバータの数を大幅に減らすことができ、しかも数の多い加入者端末に汎用部品が使えるため、ハブの小型化、端末の低廉化が図れる。

【0023】またハブと加入者宅間には、既存の伝送路を活用できることから、システム全体の設備投資を削減でき、しかも従来にない多チャンネルの映像サービスを提供できるなど、経済性に優れた実用上の効果を有する。

【図面の簡単な説明】

【図1】本発明の第1の実施例のCATV伝送システム

(4)

特開平7-170244

5

6

の構成を示すブロック図である。

【符号の説明】

- 1 16QAM変調器群
- 2 周波数多重部(FDM)
- 3 光送信部(E/O)
- 4 光ファイバ
- 5 光受信部(O/E)
- 6 周波数変換部

- 7 分配スイッチ部
- 8 送信部
- 9 選局信号受信部
- 10 受信部
- 11 選局部
- 12 16QAM復調器
- 13 選局キーボード
- 14 選局信号送出部

4: 光ファイバ
6: 周波数変換部

フロントページの続き

(51)Int.Cl. ⁵	識別記号	片内整理番号	F I	技術表示箇所
H 0 4 H 1/02		Z		

(72)発明者 工藤 義春
大阪府門真市大字門真1006番地 松下電器
産業株式会社内